

Three new egg parasites of South African walking sticks (Hymenoptera: Chrysididae, Amiseginae)

by

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A new genus, *Afrosega*, is described for two new species from Cape Province, *A. petiolata* (type-species) and *A. capensis*. A new species, *Reidia natalensis*, is described from Natal. All species are figured.

Twenty-five years ago (Krombein, 1957) I published a generic reclassification of the Amiseginae, several species of which had been reared from the eggs of walking sticks (Phasmatodea). I recognized three series within the subfamily: the American found in both North and South America; the Australasian ranging from Australia and Melanesia westward to the Indian subcontinent and northward to the Philippines; and the African from Zimbabwe to South Africa. The American Series is the most primitive in that both sexes are fully winged and the mesosoma is less modified. The Australasian Series has fully winged males, females that are either fully winged or brachypterous with the wings no larger than the tegula, and both sexes have the postscutellum covering most of the hind part of the mesosoma. The African Series is the most specialized. Both sexes are apparently wingless and the mesoscutum is expanded laterally so that the tiny tegula and wing pads, if present, are entirely concealed in dorsal view.

I recognized three African genera, *Alieniscus* Benoit with two species, *Reidia* Krombein with one species, and *Obenbergerella* Strand (= *Alienus* Bridwell, not Handlirsch) with a single species. To these may now be added a second new species of *Reidia*, and the remarkable new genus, *Afrosega* with two new species. *Afrosega* is the only known amisegine with a petiolate abdomen and specialized macrochaetae on the head, scutum and sometimes on the metasoma.

The mandible of all female Amiseginae is stout at the base, tapers gradually to a sharp point, and is, therefore, admirably adapted to piercing the thick chorion of the host egg. Readshaw (1965: 482, pl. 1) demonstrated that the female pierces the egg with her mandibles, feeds on the exuding yolk, then turns around, inserts the ovipositor in the feeding puncture and lays an egg. This process may be repeated several times with the same host egg, but only one parasite develops within the egg. In temperate regions the adult parasite emerges the following year, or occasionally overwinters for two seasons. It escapes by bursting off the operculum of the egg just as does the walking stick nymph.

Hosts are known for nine species of American and Australasian Amiseginae (Krombein, in press) but none are known for the African species. Inasmuch as the mandibular form is identical in all female Amiseginae, it is reasonable to suppose that

all members of the subfamily parasitize walking stick eggs. Although most of the known host walking sticks broadcast their eggs onto the ground, the parasites have successfully invaded other ecological niches in which eggs are deposited, such as on leaf surfaces, beneath loose bark and in decaying wood.

The single female of *Reidia natalensis* spec. nov. was collected from Berlese sifting of litter beneath *Buddleia*. This is the same habitat in which I captured numerous flightless amisequine females in Sri Lanka. Undoubtedly these flightless females were searching for host eggs in the leaf litter. I anticipate that males of *Reidia* would be found searching for females in this same ecological niche. Males of all Ceylonese Amiseginae are fully winged, and those of flightless females are found flying low over or alighting upon leaf litter in their search for females.

The possible host relationship of *Afrosega* is more puzzling because almost all specimens of both species were captured in Malaise traps. This is rather unusual behaviour for flightless species. It suggests the possibility that *Afrosega* may parasitize eggs laid in an arboreal substrate such as on leaves or in bark crevices. The females, as in the single specimen of *A. capensis*, would climb upwards searching for host eggs, and the males, as in the nine male specimens of *A. petiolata*, would also climb upward seeking females with which to mate. However, the single female of *A. petiolata* was obtained from forest litter berlesiate.

The head was not deformed in the seven African specimens examined earlier (Krombein, 1957). However, the 12 additional specimens now available have the vertex behind the ocelli indented, sometimes medially, sometimes toward one side or the other. I noted similar malformation in some Ceylonese specimens (Krombein, 1983). It seems probable that these injuries are incurred in those unusual specimens that emerge as teneral rather than as fully hardened individuals.

Reidia and *Afrosega* are the only genera known from both sexes and there is remarkably little sexual dimorphism. The male has five rather than four exerted metasomal segments, and the mandible in *Reidia* male is slightly stouter and flattened toward the apex. I anticipate that the unknown males of *Alieniscus* and *Obenbergerella* also will differ only slightly from their respective females.

Key to the Genera of African Amiseginae

- 1 Dorsum of mesosoma with coarse, confluent punctures arranged in longitudinal rows; postscutellum not extending to apex of mesosoma, so propodeum has a distinct dorsal surface; femora beneath and tibiae above with long, erect scattered setae **Alieniscus** Benoit
- Dorsum of mesosoma either with more scattered coarse or fine punctures, or delicately and closely carinulate in part or entirely; postscutellum extending to apex of mesosoma, propodeum without a dorsal surface; femora and tibiae with short, appressed to subappressed setae 3
- 2 First metasomal segment (fig. 7) with a petiole about a fourth as long as the segment; upper part of head (figs 1, 2), anterior and lateral margins of scutum (figs 3, 4) and sometimes the scutellum, upper propodeum, first three metasomal terga (fig. 7) and second to fourth sterna with a few long curved macrochaetae; propodeal surface sloping gradually from metasomal dorsum to apex of segment (fig. 3) **Afrosega** gen. nov.
- First metasomal segment (fig. 5) not petiolate, sides diverging from base to apex; body without long curved macrochaetae; propodeal surface abruptly declivous from metasomal dorsum 3
- 3 Metasomal dorsum closely, longitudinally carinulate, those on pronotum tending to be evanescent; outer surface of coxae closely, transversely carinulate; median pronotal length

twice that of postscutellum; frontal concavity with fewer, coarser transverse rugae

- Mesosomal dorsum not lineolate, delicately shagreened and with scattered minute punctures; outer surface of coxae smooth; median pronotal length 1.3 times that of postscutellum **Obenbergerella** Strand

Genus *Afrosega* gen. nov.

Type-species: *Afrosega petiolata* spec. nov.

The generic name is feminine and is formed from the Latin *affer* African, and *-sega* from *Amisega* Cameron, the type-genus of the subfamily.

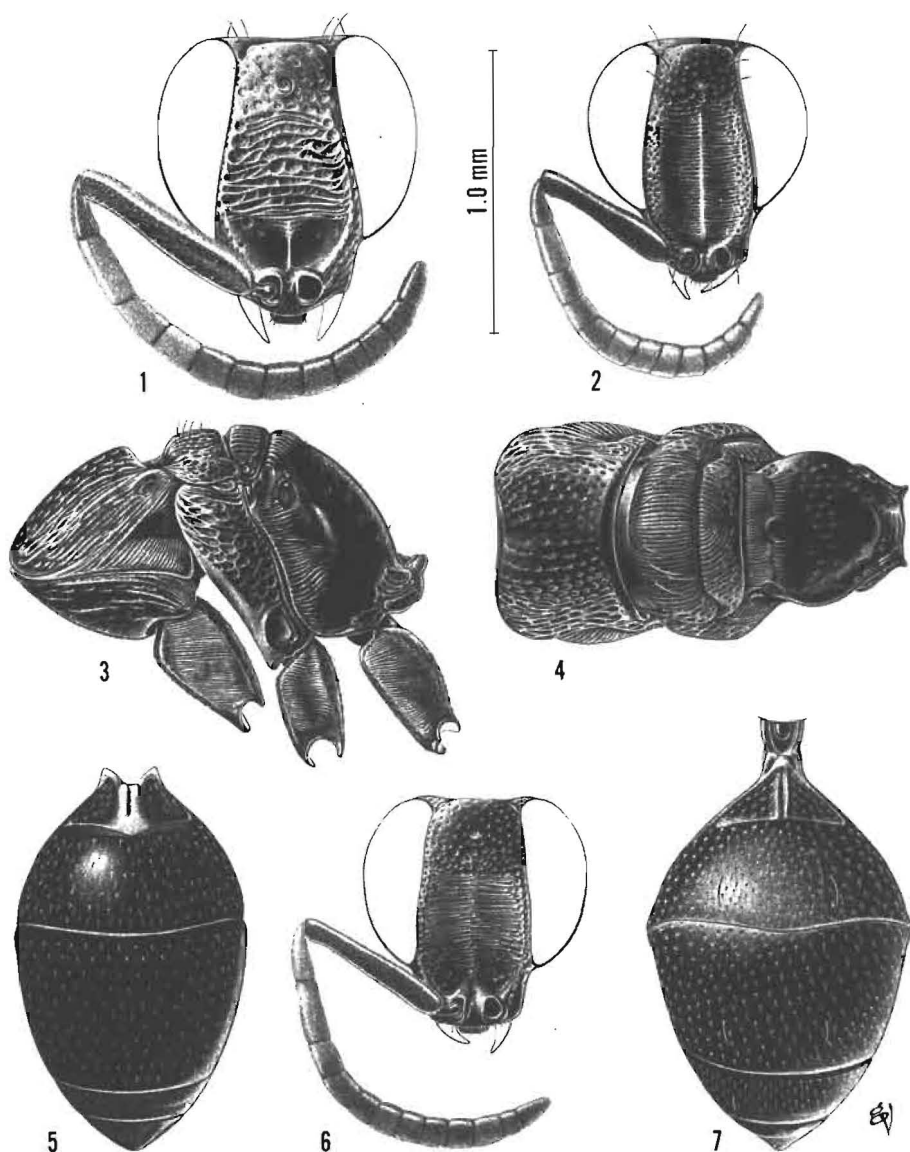
This unusual genus from Cape Province, South Africa, contains only two species, *A. petiolata* spec. nov., known from both sexes, and *A. capensis* spec. nov., represented by a unique female. The two species are extremely similar in most important details and differ most notably in that abdominal macrochaetae are present in the female of *A. capensis* and lacking in both sexes of *A. petiolata*, and in the more coarsely sculptured frontal concavity of the latter species (cf. figs 1, 2).

This genus is unique among Amiseginae in having a petiolate abdomen and specialized macrochaetae on the head, mesosoma, and occasionally the metasoma. Macrochaetae on the head are either sometimes denuded in part, or they may be variable in number.

GENERIC DIAGNOSIS. Head as figured (figs 1, 2); clypeal apex not thickened; malar space punctate, without longitudinal groove; frontal concavity sometimes smooth on lower third and transversely, irregularly rugulose-reticulate on upper two-thirds, and sometimes entirely with close transverse rugulae; front punctate to rugulose-reticulate between concavity and anterior ocellus; ocelli in an equilateral triangle, ocellar area with small punctures and a pair or two of recurved macrochaetae behind and to either side of anterior ocellus; eye clothed with very short microchaetae which are scarcely visible at 100X; vertex indented in middle, very sparsely punctate and with one to four pairs of forwardly directed macrochaetae along inner eye margin; occipital carina distinct; scape 1.1 times as long as pedicel and first two flagellar segments, flagellum slightly fusiform, intermediate segments flattened beneath, about as long as wide.

Mesosoma in lateral view (fig. 3), in dorsal view (fig. 4); pronotal dorsum convex, apical margin thickened, length 0.7–0.8 times greatest width and 1.7–2.1 times length of scutum; normally exposed part of the latter closely longitudinally rugulose, with two to three pairs of recurved macrochaetae in a transverse curved row anteriorly, notauli and parapsides not evident, 2.2 times as long as scutellum; lateral lobe of scutum overhanging a tiny tegula; scutellum subequal in length to postscutellum, closely longitudinally ruguloso-punctate except arcuately rugulose in middle; mesopleuron with a weak ridge along anterior margin; metapleuron closely, longitudinally carinate; outer surface of coxae closely longitudinally carinate; vestiture of legs short, appressed; tarsal segments beneath with two rows of tiny spines, claws simple; posterior surface of propodeum sloping gradually downward from postscutellum.

Metasoma in dorsal view (fig. 7), first segment with a petiole about a fourth as long as segment and with a strong median groove on basal half of enlarged part of tergum; female of *A. capensis* with specialized macrochaetae on first to third terga and second to fourth sterna.



Figs 1-7. 1. Frontal view head, *Afrosega petiolata* spec. nov. 2. Frontal view head, *Afrosega capensis* spec. nov. 3. Lateral view thorax and coxae, *A. petiolata*. 4. Dorsal view thorax *A. petiolata*. 5. Dorsal view abdomen *Reidia natalensis* spec. nov. 6. Frontal view head *R. natalensis*. 7. Dorsal view abdomen *A. capensis*.

Afrosega petiolata spec. nov., figs 1, 3, 4.

A. petiolata, known from both sexes, is rather similar to *A. capensis*, known from a unique female. *A. petiolata* has a more coarsely sculptured frontal concavity (cf. figs 1, 2), and lacks the specialized macrochaetae on the postscutellum, upper propodeal surface, and on the metasoma.

MALE. Length 3.4–3.6 mm. Black, head occasionally with dark blue reflections, scutum and scutellum occasionally weakly bronze, side of pronotum usually chestnut, scape beneath usually and first three flagellar segments stramineous, legs in part occasionally light brown. Relatively long, curved specialized black macrochaetae present as follows: one or two pairs behind and to either side of anterior ocellus, two to four pairs along inner eye margin on vertex, usually three but occasionally four pairs in a curved transverse row anteriorly on normally exposed part of scutum.

Head in frontal view (fig. 1); mandible stout at base, tapering to an acute point, not flattened; frontal concavity smooth on lower third, with somewhat irregular, separated rugulae on upper two-thirds; front punctate to rugulose-reticulate between concavity and anterior ocellus; macrochaetae black; vestiture otherwise short, subappressed, cinereous, sparse on front and vertex, denser on temples.

Mesosoma in lateral view (fig. 3), in dorsal view (fig. 4), vestiture very sparse, subappressed and cinereous; pronotal dorsum glossy, with small punctures in middle mostly separated by at least the diameter of a puncture but becoming confluent in longitudinal rows toward side; lateral surface of pronotum with delicate, close longitudinal carinae; mesopleuron moderately coarsely and closely pitted; legs with short appressed setae, rather sparse on anterior and posterior surfaces of femora and denser above, and sparse on outer surface of tibiae and denser beneath; propodeum smooth except a narrow anterior area closely longitudinally carinate as well as a small area at apex.

Vestiture of metasoma short, appressed, moderately dense on terga, very sparse on sterna; posterior half of first tergum and all of succeeding exposed terga with small punctures separated by about the diameter of a puncture and with some scattered, interspersed minute punctures.

FEMALE. Length 3.3 mm. Very similar to male except as follows: Black, scape and first three flagellar segments beneath, side of pronotum, propleuron, anterior margin of mesopleuron, trochanters, extreme base of femora, first metasomal laterotergum and first sternum, light red. Head with only one macrochaeta at upper inner margin of left eye; two pairs of macrochaetae on scutum.

MATERIAL EXAMINED. SOUTH AFRICA: Cape Province: ♂ holotype and 4 ♂ paratypes, Stormsriviere, Skuinsbos Forest, 100 m, 6–30.xii.1981, S. B. Peck, Lot 81–144; 2 ♂ paratypes, same locality and collector, but Goesabos Forest, 5–30.xii.1981, Lot 81–142; 2 ♂ paratypes, same Province and collector but Knysna, Diepwalle Forest, 400 m, 12–30.xii.1981, Lot 81–155; 1 ♀ allotype, same locality data as preceding but 13.xii.1981, S. & J. Peck, Ber[lese] forest litter. All male specimens were captured in Malaise traps set in lowland cloud forest. The lower section of baffle was treated with a contact insecticide and the moribund specimens dropped off the baffle into an aluminum pan trap set below on the ground surface. The holotype and allotype are deposited in the Transvaal Museum, Pretoria, South Africa, and paratypes are in the National Museum of Natural History, Smithsonian Institution, Washington,

the Biosystematics Research Institute, Ottawa, and the British Museum (Natural History), London.

***Afrosega capensis* spec. nov., figs 2, 7**

FEMALE. Length 3,3 mm. Black, the following castaneous to dark brown: mandible except apex, antennae beneath, side of pronotum, scutum narrowly at side, scutellum narrowly behind, apex of propodeum, and petiole. Relatively long, curved specialized macrochaetae present as follows: two pair behind and to either side of anterior ocellus, one pair along inner eye margin behind posterior ocellus, two pairs on occiput at upper eye margin, three or four pairs anterolaterally on pronotal disk and a pair posterolaterally, two pairs anteriorly on scutum, a pair laterally on postscutellum, an anterolateral pair on upper propodeal surface, a pair at posterior two-thirds of first metasomal tergum separated by about a third the width of sclerite, a smaller pair similarly placed on second and third terga, and second to fourth sterna with 12, 8 and 6 scattered macrochaetae.

Head in frontal view (fig. 2); frontal concavity entirely more delicately, evenly and closely rugulose than in *A. petiolata*; and with vague median ridge on upper two-thirds; front above concavity with small separated punctures; vestiture, except macrochaetae short, very sparse, cinereous and subappressed, somewhat denser on temples.

Pronotum with median length 0,8 times greatest width, dorsum somewhat dull from close delicate longitudinal carinules and with scattered small punctures mostly separated by once to twice the diameter of a puncture, side of pronotum more coarsely lineolate and with scattered punctures; normally exposed part of scutum obliquely rugulose, anterior normally concealed section closely, longitudinally carinulate on median third; mesopleuron moderately closely and coarsely pitted; vestiture of legs as in *A. petiolata*; anterior third of upper propodeal surface with close longitudinal rugulae, posterior two-thirds delicately carinulate.

Vestiture of metasoma (fig. 7) much as in *A. petiolata* but a little shorter, the punctures smaller and somewhat denser, many separated by about the diameter of a puncture.

MALE. Unknown.

MATERIAL EXAMINED. SOUTH AFRICA: Cape Province: ♀ holotype, Cape of Good Hope Nature Reserve, 7-10.iii.1968, in Malaise trap at Oliphantbos, Paul Spangler, USNM Type 100604. This specimen was recovered from the killing jar at the top of a large Malaise trap set in shrubbery near the sea coast. The baffle was in contact with the ground and the female must have crawled upward and then sideward into the killing jar.

***REIDIA* Krombein, 1957**

The original generic diagnosis was based on just the type-species, *Reidia turneri* Krombein. The discovery of *R. natalensis* spec. nov. requires the following changes in the diagnosis: the frontal concavity may have a weak median ridge, the middle of the pronotal dorsum may have longitudinal lineolations ranging from evanescent to well-developed, the median pronotal length may be 1,2 times the combined lengths of scutum and scutellum rather than being subequal and 2,4 times as long as postscutellum rather than twice as long.

***Reidia natalensis* spec. nov., figs 5, 6.**

This species is separated from *R. turneri* Krombein as noted above under the generic heading and by having the integument of meso- and metasoma predominantly black instead of light reddish brown, by having closer transverse rugulae in the frontal concavity, and by having the anterior third of first metasomal tergum with large close punctures rather than delicate, close arcuate lineolations.

FEMALE. Length 3.1 mm. Black, upper front, scutum, scutellum and postscutellum with weak bronzy reflections, the following light red to light brown: mandible except tip, first four flagellar segments beneath, side of pronotum narrowly below and more broadly posteriorly, propleuron, mesopleuron, lower edge of metapleuron, propodeum with spiracular area and lower edge of lateral and posterior surfaces, apices of coxae, trochanters, laterotergum and sternum of first metasomal segment; remainder of legs and basal third of first metasomal tergum darker brown. Vestiture mostly very sparse, short, appressed and cinereous, denser and silvery on temples.

Head in frontal view (fig. 6); frontal concavity with closer, more delicate transverse rugulae than in *R. turneri* and with a weak median ridge; front above concavity with small, shallow subcontiguous punctures; ocellar area with smaller, more separated punctures, ocelli in a large equilateral triangle; vertex indented.

Mesosomal dorsum with median pronotal length 0.9 times greatest width, 1.2 times combined lengths of scutum and scutellum, and 2.4 times length of postscutellum; pronotal dorsum with small punctures mostly separated by one to two times the diameter of a puncture, anterior half on median third with evanescent longitudinal rugulae, the dorsum laterally as well as the lateral surface with close longitudinal rugulae; scutum and postscutellum with close longitudinal rugulae; scutellum on anterior half with delicate longitudinal carinules, posterior half with arcuate to transverse rugulae; mesopleuron anteriorly with ridge; upper third with close longitudinal rugulae, lower two-thirds with moderately large, irregularly scattered punctures; metapleuron closely, longitudinally rugulose; declivous posterior surface of propodeum with close longitudinal rugulae on upper half and with scattered punctures on lower half; lateral propodeal surface with evanescent oblique rugulae.

Dorsum of metasoma (fig. 5); basal third of first tergum with larger punctures separated by the diameter of a puncture, apical two-thirds of first and all of second tergum with smaller punctures separated by two or more times the diameter of a puncture; third and fourth terga with tiny, more numerous punctures.

MALE. Unknown.

MATERIAL EXAMINED. SOUTH AFRICA: Natal: ♀ holotype, Cathedral Peak For[est] Sta[tion], 75 km WSW Estcourt, 1800 m, 23.xii.1979, S. & J. Peck, [from] Berlese *Buddleia* litter. The holotype is deposited in the Transvaal Museum, Pretoria, South Africa.

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